

AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (Cancelled)
2. (Cancelled)
3. (Cancelled)
4. (Cancelled)
5. (Cancelled)
6. (Cancelled)
7. (Cancelled)
8. (Currently Amended) In a data-packet processor, a configurable queueing system for packet accounting during processing, the system comprising:
a plurality of queues arranged in one or more clusters;
an identification mechanism for creating a packet identifier for arriving packets,
wherein the packet identifier created is associated to a memory location
where the packet itself is stored during processing, and ;
insertion logic for inserting packet identifiers into queues and for determining into
which queue to insert a packet identifier, wherein the packet identifier
created and queued comprises, in addition to the memory location, one or
more of an identifier of a device from which the packet was received, an
indication of whether the packet has increased or decreased in total size
during processing, an indication of whether or not processing was
completed on the associated packet, a next queue into which the packet
identifier should be inserted, and an identifier of whether the packet is
currently being processed; and

selection logic for selecting packet identifiers from queues to initiate processing of identified packets, downloading of completed packets, or for requeueing of the selected packet identifiers.

~~The queueing system of claim 6 wherein the packet identifier created and queued comprises, in addition to the memory location, one or more of an identifier of a device from which the packet was received, an indication of whether the packet has increased or decreased in total size during processing, an indication of whether or not processing was completed on the associated packet, a next queue into which the packet identifier should be inserted, and an identifier of whether the packet is currently being processed.~~

9. (Currently Amended) The queueing system of claim 1 wherein claim 8 wherein the insertion logic determines a priority for a packet, and inserts the packet into a particular queue depending on the priority determined.
10. (Original) The queueing system of claim 9 wherein clusters are numbered, and priority for processing identified packets is by cluster number.
11. (Original) The queueing system of claim 8 wherein the selection system selects packets for requeueing based on the value of the next queue number set in the packet identifier.
12. (Original) The queueing system of claim 8 wherein the selection system selects packets for downloading based on the value of the indication of whether processing on the associated packet is completed.
13. (Original) The queueing system of claim 10 wherein the selection system selects packets for processing based upon priority by queue number.
14. (Original) The queueing system of claim 13 wherein a fairness algorithm is followed in selecting a queue within a priority cluster for selecting a packet for processing.

15. (Currently Amended) The queueing system of ~~claim 1 wherein~~ claim 8 wherein the data-packet processor is a multi-streaming processor having separate contexts implemented by context registers and associated with individual streams, and the selection system causes header information from a packet associated with a selected identifier to be loaded into an available context.
16. (Original) the queueing system of claim 15 wherein there are more contexts that streams, and loading of header information into available contexts is accomplished in background, that is, in parallel with processing of packets.
17. (Original) The queueing system of claim 8 wherein software executed by the processor is enabled to manipulate value of individual ones of fields in a packet identifier.
18. (Currently Amended) The queueing system of ~~claim 1 wherein~~ claim 8 wherein the insertion logic inserts packets into queues at least in part according to flow, and wherein insertion and selection logic cooperate to preserve order of packets in individual flows.
19. (Currently Amended) The queueing system of ~~claim 1 wherein~~ claim 8 wherein the insertion logic treats packets incoming from the network or switching fabric with highest priority for identifier insertion into a queue, packet identifiers to be requested with a next highest priority, and identifiers for packets generated by software with a lowest priority.
20. (Cancelled)
21. (Cancelled)
22. (Cancelled)
23. (Cancelled)
24. (Cancelled)
25. (Cancelled)
26. (Cancelled)

27. (Currently Amended) A data-packet processor, comprising:
an input buffer for buffering incoming packets from one or more sources;
a local packet memory for storing packet data during processing;
a stream processor unit for processing packet data; and
a configurable queueing system for packet accounting during processing;
wherein the queueing system comprises a plurality of queues arranged in one or
more clusters, an identification mechanism for creating a packet identifier
for arriving packets, insertion logic for inserting packet identifiers into
queues and for determining into which queue to insert a packet identifier,
and selection logic for selecting packet identifiers from queues to initiate
processing of identified packets, downloading of completed packets, or for
requeueing of the selected packet identifiers; and
wherein the packet identifier created is associated to a memory location where the
packet itself is stored during processing; and
- The processor of ~~claim 25~~ wherein the packet identifier created and queued comprises, in addition to the memory location, one or more of an identifier of a device from which the packet was received, an indication of whether the packet has increased or decreased in total size during processing, an indication of whether or not processing was completed on the associated packet, a next queue into which the packet identifier should be inserted, and an identifier of whether the packet is currently being processed.
28. (Currently Amended) ~~The processor of claim 20 wherein~~ claim 27 wherein the insertion logic determines a priority for a packet, and inserts the packet into a particular queue depending on the priority determined.
29. (Original) The processor of claim 28 wherein clusters are numbered, and priority for processing identified packets is by cluster number.

30. (Original) The processor of claim 27 wherein the selection system selects packets for requeueing based on the value of the next queue number set in the packet identifier.
31. (Original) The processor of claim 27 wherein the selection system selects packets for downloading based on the value of the indication of whether processing on the associated packet is completed.
32. (Original) The processor of claim 29 wherein the selection system selects packets for processing based upon priority by queue number.
33. (Original) The processor of claim 32 wherein a fairness algorithm is followed in selecting a queue within a priority cluster for selecting a packet for processing.
34. (Currently Amended) The processor of ~~claim 20 wherein~~ claim 27 wherein the data-packet processor is a multi-streaming processor having separate contexts implemented by context registers and associated with individual streams, and the selection system causes header information from a packet associated with a selected identifier to be loaded into an available context.
35. (Original) the processor of claim 34 wherein there are more contexts that streams, and loading of header information into available contexts is accomplished in background, that is, in parallel with processing of packets.
36. (Original) The processor of claim 27 wherein software executed by the processor is enabled to manipulate value of individual ones of fields in a packet identifier.
37. (Currently Amended) The processor of ~~claim 20 wherein~~ claim 27 wherein the insertion logic inserts packets into queues at least in part according to flow, and wherein insertion and selection logic cooperate to preserve order of packets in individual flows.

38. (Currently Amended) The processor of ~~claim 20 wherein~~claim 27 wherein the insertion logic treats packets incoming from the network or switching fabric with highest priority for identifier insertion into a queue, packet identifiers to be queued with a next highest priority, and identifiers for packets generated by software with a lowest priority.
39. (Cancelled)
40. (Cancelled)
41. (Cancelled)
42. (Cancelled)
43. (Cancelled)
44. (Cancelled)
45. (Cancelled)
46. (Currently Amended) A method for accounting for packets in a data-packet processor, comprising:
providing in the processor a plurality of queues in one or more clusters;
creating a packet identifier for arriving packets, wherein the packet identifier created is associated to a memory location where the packet itself is stored during processing;
inserting packet identifiers into queues by an insertion mechanism having logic for determining into which queue to insert, wherein the packet identifier created and queued comprises, in addition to the memory location, one or more of an identifier of a device from which the packet was received, an indication of whether the packet has increased or decreased in total size during processing, an indication of whether or not processing was completed on the associated packet, a next queue into which the packet identifier should be inserted, and an identifier of whether the packet is currently being processed; and

selecting packet identifiers from the queues by selection logic, for initiating processing of identified packets, downloading of completed packets, or for requeueing of the selected packet identifiers.

~~The method of claim 44 wherein the packet identifier created and queued comprises, in addition to the memory location, one or more of an identifier of a device from which the packet was received, an indication of whether the packet has increased or decreased in total size during processing, an indication of whether or not processing was completed on the associated packet, a next queue into which the packet identifier should be inserted, and an identifier of whether the packet is currently being processed.~~

47. (Currently Amended) The method of ~~claim 39 wherein~~claim 46 wherein the insertion logic determines a priority for a packet, and inserts the packet into a particular queue depending on the priority determined.
48. (Original) The method of claim 47 wherein clusters are numbered, and priority for processing identified packets is by cluster number.
49. (Original) The method of claim 46 wherein the selection system selects packets for requeueing based on the value of the next queue number set in the packet identifier.
50. (Original) The method of claim 46 wherein the selection system selects packets for downloading based on the value of the indication of whether processing on the associated packet is completed.
51. (Original) The method of claim 48 wherein the selection system selects packets for processing based upon priority by queue number.
52. (Currently Amended) The method of ~~claim 13 wherein~~claim 51 wherein a fairness algorithm is followed in selecting a queue within a priority cluster for selecting a packet for processing.

53. (Currently Amended) The method of ~~claim 39 wherein~~ claim 46 wherein the data-packet processor is a multi-streaming processor having separate contexts implemented by context registers and associated with individual streams, and the selection system causes header information from a packet associated with a selected identifier to be loaded into an available context.
54. (Original) the method of claim 53 wherein there are more contexts that streams, and loading of header information into available contexts is accomplished in background, that is, in parallel with processing of packets.
55. (Currently Amended) The method of ~~claim 8 wherein~~ claim 46 wherein software executed by the processor is enabled to manipulate value of individual ones of fields in a packet identifier.
56. (Currently Amended) The method of ~~claim 39 wherein~~ claim 46 wherein the insertion logic inserts packets into queues at least in part according to flow, and wherein insertion and selection logic cooperate to preserve order of packets in individual flows.
57. (Currently Amended) The method of ~~claim 39 wherein~~ claim 46 wherein the insertion logic treats packets incoming from the network or switching fabric with highest priority for identifier insertion into a queue, packet identifiers to be requeued with a next highest priority, and identifiers for packets generated by software with a lowest priority.
58. (Currently Amended) In a data packet processor having a queueing system for managing arriving packets waiting to be processed, a packet queueing system comprising:
- a fixed range of packet numbers; and
- an assignment facility;

characterized in that the assignment facility accounts for individual numbers in the fixed range, marking numbers invalid as packets in the queueing system are sent to be processed or software activates them, and reassigning invalid numbers to newly arrived packets put into the ~~queueing system~~ system;

wherein a packet number created is associated to a memory location where the packet itself is stored during processing; and

wherein the packet identifier created and queued comprises, in addition to the memory location, one or more of an identifier of a device from which the packet was received, an indication of whether the packet has increased or decreased in total size during processing, an indication of whether or not processing was completed on the associated packet, a next queue into which the packet identifier should be inserted, and an identifier of whether the packet is currently being processed.

59. (Cancelled)